9617
103

# PHYSICS ABSTRACTS

BEING

## SCIENCE ABSTRACTS—SECTION A

VOL. XLIV

1941

EDITED AND ISSUED BY

THE INSTITUTION OF ELECTRICAL ENGINEERS

SAVOY PLACE, VICTORIA EMBANKMENT, LONDON, W.C.2

IN ASSOCIATION WITH

THE PHYSICAL SOCIETY

THE AMERICAN PHYSICAL SOCIETY

THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS

APRIL, 1942

U OF I
LIBRARY

# CONTENTS


| | Page |
|---|---|
| List of Journals | iii |
| List of Abstractors | x |
| Abstracts: | |
| General Physics | 1, 27, 51, 73, 109, 141, 165, 205, 251, 287, 327, 359 |
| Astronomy and Astrophysics | 10, 34, 59, 83, 117, 151; 178, 218, 261, 297, 334, 370 |
| Geophysics | 12, 34, 61, 89, 117, 152, 180, 224, 261, 301, 336, 375 |
| Radioactivity | 14, 38, 63, 92, 119, 152, 185, 226, 264, 305, 338, 380 |
| Radiation | 15, 39, 64, 93, 121, 153, 186, 228, 264, 306, 340, 380 |
| Heat | 21, 44, 68, 101, 128, 157, 196, 238, 274, 314, 346, 389 |
| Acoustics | 22, 44, 71, 102, 132, 158, 198, 241, 277, 316, 349, 394 |
| Electricity and Magnetism | 23, 45, 71, 103, 134, 159, 198, 243, 279, 318, 351, 395 |
| Author Index | 401 |
| Subject Index | 459 |


**ERRATUM**

Abstract No. 2312, line 2: *for* Hulbert, *read* Hulburt.

1
S3
Vol. 44
1941
N/C

# LIST OF JOURNALS

* Denotes a Journal from which only articles on Physics are abstracted.

| *Abbreviations* | *Full title and address* |
|---|---|
| *Akust. Z. | Akustische Zeitschrift. S. Hirzel, Königstrasse 2, Leipzig, C.1, Germany. |
| Amer. J. Phys. | American Journal of Physics. The American Institute of Physics, 175 Fifth Avenue, New York. |
| *Amer. J. Roentgenol. and Radium Ther. | American Journal of Roentgenology and Radium Therapy. Charles C. Thomas, 220 East Monroe Street, Springfield, Illinois, U.S.A. |
| Amer. J. Sci. | American Journal of Science. New Haven, Connecticut, U.S.A. |
| Ann. Astrophys, Obs. Smithson. Instn | Annals of the Astrophysical Observatory of the Smithsonian Institution. Washington, D.C. |
| Ann. Harv. Coll. Obs. | Annals of the Harvard College Observatory. Cambridge, Mass., U.S.A. |
| Ann. Phys., Lpz. | Annalen der Physik. J. A. Barth, Salomonstrasse 18b, Leipzig, C.1, Germany. |
| Ann. Solar Phys. Obs. | Annals of the Solar Physics Observatory, Cambridge. The Cambridge University Press, Bentley House, Euston Road, London, N.W.1. |
| *Arch. Elektrotechn. | Archiv für Elektrotechnik. J. Springer, Linkstrasse 22–24, Berlin, W.9. |
| *Arch. Sci. Phys. Nat. | Archives des Sciences Physiques et Naturelles. Institut de Physique de l'Université, Geneva, Switzerland. |
| *Arch. techn. Messen | Archiv für technisches Messen. R. Oldenbourg, Schliessfach 31, Münich 1, Germany. |
| *Ark. Kemi Min. Geol. | Arkiv för Kemi, Mineralogi och Geologie. Almqvist och Wiksells Boktryckeri-A.B., Stockholm; and H. K. Lewis & Co., Ltd., 136 Gower Street, London, W.C.1. |
| *Ark. Mat. Astr. Fys. | Arkiv för Matematik, Astronomi och Fysik. Almqvist och Wiksells Boktryckeri-A.B., Stockholm; and H. K. Lewis & Co., Ltd., 136 Gower Street, London, W.C.1. |
| Astrophys. J. | Astrophysical Journal. The University of Chicago Press, 5750 Ellis Avenue, Chicago, Illinois, U.S.A. |
| *Brit. J. Radiol. | British Journal of Radiology. The British Institute of Radiology, 32 Welbeck Street, London, W.1. |
| *Bull. Amer. Math. Soc. | Bulletin of the American Mathematical Society. 312 Schenectady Avenue, Brooklyn, N.Y., U.S.A. |
| *Bull. Amer. Met. Soc. | Bulletin of the American Meteorological Society. Blue Hill Meteorological Observatory, Harvard University, Cambridge, Mass., U.S.A. |
| *Bull. Calcutta Math. Soc. | Bulletin of the Calcutta Mathematical Society. The Secretary, 92 Upper Circular Road, Calcutta, India; and Bowes & Bowes, 1 Trinity Street, Cambridge, England. |
| *Bull. Chem. Soc. Japan | Bulletin of the Chemical Society of Japan. Faculty of Science, Imperial University of Tokyo, Japan. |
| Bull. Earthq. Res. Inst., Tokyo | Bulletin of the Earthquake Research Institute. Tokyo Imperial University, Komaba, Tokyo. |
| Bull. Harv. Coll. Obs. | Bulletin of the Harvard College Observatory. The Observatory, Cambridge, Mass., U.S.A. |
| *Bull. Int. Un. Geod. and Geophys. | Bulletin of the International Union of Geodesy and Geophysics. General Secretary: Brigadier H. S. L. Winterbotham, C.B. C.M.G., D.S.O., Grandfathers, Broughton, Hants, England. |
| Bull. Lick Obs. | Bulletin of the Lick Observatory. University of California, Berkeley, California, U.S.A. |

| *Abbreviations* | *Full title and address* |
|---|---|
| *Bull. Math. Biophys. | Bulletin of Mathematical Biophysics. University of Chicago Press, 5750 Ellis Avenue, Chicago, Illinois, U.S.A. |
| Bull. Seism. Soc. Amer. | Bulletin of the Seismological Society of America. The University of California Press, Berkeley, California, U.S.A. |
| *Bull. Univ. Ill. Engng Exp. Sta. | Bulletin of the University of Illinois Engineering Experiment Station. University of Illinois, Urbana, Illinois, U.S.A. |
| *Bull. U.S. Bur. Min. | Bulletin of the Bureau of Mines. Superintendent of Documents, Government Printing Office, Washington, D.C. |
| *Bur. Stand. J. Res., Wash. | Journal of Research of the National Bureau of Standards. Superintendent of Documents, Government Printing Office, Washington, D.C. |
| *Canad. J. Res. | Canadian Journal of Research. National Research Council of Canada, Ottawa. |
| *Carnegie Instn Yearb. | Carnegie Institution Yearbook. The Carnegie Institution of Washington, Washington, D.C. |
| Circ. Harv. Coll. Obs. | Circular of the Harvard College Observatory. The Observatory, Cambridge, Mass., U.S.A. |
| Circ. Un. Obs., Johannesb. | Circular of the Union Observatory of South Africa. Johannesburg, South Africa. |
| *Circ. U.S. Bur. Stand. | Circular of the National Bureau of Standards. Superintendent of Documents, Government Printing Office, Washington, D.C. |
| *Coll. Pap. Fac. Sci., Osaka Imp. Univ. | Collected Papers from the Faculty of Science. Osaka Imperial University, Osaka, Japan. |
| *Curr. Sci. | Current Science. B. N. Sastri, Indian Institute of Science, Hebbal P.O., Bangalore, India. |
| *Econ. Proc. Roy. Dublin Soc. | Economic Proceedings of the Royal Dublin Society. Ballsbridge, Dublin; and Williams & Norgate, 36 Great Russell Street, London, W.C.1. |
| *Econ. Pap. U.S. Bur. Min. | Economic Papers of the Bureau of Mines. U.S. Department of Commerce, Superintendent of Documents, Government Printing Office, Washington, D.C. |
| *Engineer, Lond. | Engineer. 28 Essex Street, Strand, London, W.C.2. |
| *Engineering | Engineering. 18 and 20 Compton Road, Hayes, Middlesex, England. |
| *Engng Exp. Sta., Univ. Minnesota, Minneapolis, Techn. Pap. | Engineering Experiment Station Technical Papers. University of Minnesota Institute of Technology, Minneapolis, U.S.A. |
| *Forsch. IngWes. | Forschung auf dem Gebiete des Ingenieurwesens. Ausgabe B. V.D.I.-Verlag, G.m.b.H., Dorotheenstrasse 40, Berlin, N.W.7. |
| *Geogr. Rev. | Geographical Review. The American Geographical Society, Broadway at 156th Street, New York. |
| *Geol. Mag., Lond. | The Geological Magazine. Stephen Austin & Sons, Ltd., Fore Street, Hertford, England. |
| Geophysics | Geophysics. Society of Exploration Geophysicists, P.O. Box 777, Austin, Texas, U.S.A. |
| *Handb. U.S. Bur. Stand. | Handbook of the National Bureau of Standards. Superintendent of Documents, Government Printing Office, Washington, D.C. |
| *Helv. Phys. Acta | Helvetica Physica Acta. E. Birkhäuser et Cie, Bâle, Switzerland. |
| *Illum. Engng, N.Y. | Illuminating Engineering. Mt. Royal and Guilford Avenues, Baltimore, Maryland, U.S.A. |
| Indian J. Phys. | Indian Journal of Physics and Proceedings of the Indian Association for the Cultivation of Science. 210 Bowbazar Street, Calcutta, India. |
| *Industr. Engng Chem. | Industrial and Engineering Chemistry. The American Chemical Society, Publication Office, 20th and Northampton Streets, Easton, Pa., U.S.A. |

| *Abbreviations* | *Full title and address* |
|---|---|
| *Industr. Engng Chem. (Analyt. Edit.) | Industrial and Engineering Chemistry (Analytical Edition). The American Chemical Society, Publication Office, 20th and Northampton Streets, Easton, Pa., U.S.A. |
| *J. Acoust. Soc. Amer. | Journal of the Acoustical Society of America. The American Institute of Physics, 175 Fifth Avenue, New York. |
| *J. Aero. Sci. | Journal of Aeronautical Sciences, 20th and Northampton Streets, Easton, Pa., U.S.A. |
| *J. Amer. Chem. Soc. | Journal of the American Chemical Society. Publication Office, 20th and Northampton Streets, Easton, Pa., U.S.A. |
| *J. Appl. Mech. | Journal of Applied Mechanics. The American Society of Mechanical Engineers, 29 West 39th Street, New York. |
| *J. Appl. Phys. | Journal of Applied Physics. The American Institute of Physics, 175 Fifth Avenue, New York. |
| *J. Chem. Phys. | Journal of Chemical Physics. The American Institute of Physics, 175 Fifth Avenue, New York. |
| *J. Chem. Soc. | Journal of the Chemical Society. Burlington House, London, W.1. |
| *J. Franklin Inst. | Journal of the Franklin Institute of the State of Pennsylvania, Prince and Lemon Streets, Lancaster; and Parkway, Twentieth Street, Philadelphia, Pa., U.S.A. |
| *J. Indian Inst. Sci. | Journal of the Indian Institute of Science. The Hosali Press, 6 Ulsoor Road, Bangalore, India. |
| *J. Inst. Fuel | Journal of the Institute of Fuel. 30 Bramham Gardens, London, S.W.5. |
| *J. Inst. Petrol. | Journal of the Institute of Petroleum. The University of Birmingham, Edgbaston, Birmingham 15, England. |
| *J. Instn Auto Engrs | Journal of the Institution of Automobile Engineers. 12 Hobart Place, London, S.W.1. |
| *J. Instn Civ. Engrs | Journal of the Institution of Civil Engineers. Great George Street, London, S.W.1. |
| *J. Math. Phys. | Journal of Mathematics and Physics. The Managing Editor, Massachusetts Institute of Technology, Cambridge, Mass., U.S.A. |
| *J. Mysore Univ. | Journal of the Mysore University. Bangalore Press, Mysore Road, Bangalore City, India. |
| J. Opt. Soc. Amer. | Journal of the Optical Society of America. The American Institute of Physics, 175 Fifth Avenue, New York. |
| *J. Phys. Chem. | Journal of Physical Chemistry. Williams & Wilkins Co., Mt. Royal and Guilford Avenues, Baltimore, Maryland, U.S.A.; and Baillière, Tindall & Cox, 8 Henrietta Street, Covent Garden, London, W.C.2. |
| J. Phys., U.S.S.R. | Journal of Physics. Academy of Sciences of the U.S.S.R., Kuznetski Most 18, Moscow; and Collett's Bookshop Ltd., 66 Charing Cross Road, London, W.C.2. |
| *J. Proc. Instn Mech. Engrs, Lond. | Journal and Proceedings of the Institution of Mechanical Engineers. Storey's Gate, St. James's Park, London, S.W.1. |
| J. Roy. Astr. Soc. Can. | Journal of the Royal Astronomical Society of Canada. 198 College Street, Toronto, Canada. |
| *J. Roy. Micr. Soc. | Journal of the Royal Microscopical Society. B.M.A. House, Tavistock Square, London, W.C.1. |
| *J. Roy. Soc. Arts | Journal of the Royal Society of Arts. G. Bell & Sons, Ltd., York House, Portugal Street, London, W.C.2. |
| *J. Roy. Techn. Coll. Glasg. | Journal of the Royal Technical College, Glasgow. Robert Anderson & Sons, 142 West Nile Street, Glasgow, C.1. |
| *J. Sci. Instrum. | Journal of Scientific Instruments. Institute of Physics, The University, Reading, Berks., England. |

| *Abbreviations* | *Full title and address* |
|---|---|
| *J. Soc. Glass Technol. | Journal of the Society of Glass Technology. "Elmfield," Northumberland Road, Sheffield 10, England. |
| *J. Wash. Acad. Sci. | Journal of the Washington Academy of Sciences. 450 Ahnaip Street, Menasha, Wis., U.S.A. |
| *Jap. J. Astr. Geophys. | Japanese Journal of Astronomy and Geophysics. The Secretary, National Research Council, Imperial Academy House, Ueno Park, Tokyo. |
| *Jap. J. Math. | Japanese Journal of Mathematics. The Secretary, National Research Council, Imperial Academy House, Ueno Park, Tokyo. |
| *Jap. J. Phys. | Japanese Journal of Physics. The Secretary, National Research Council, Imperial Academy House, Ueno Park, Tokyo. |
| *Kolloid-Beih. | Kolloid-Beihefte. Theodor Steinkopff, Residenzstrasse 32, Dresden-Blasewitz, Germany. |
| *Kolloid Z. | Kolloid Zeitschrift. Theodor Steinkopff, Residenzstrasse 32, Dresden-Blasewitz, Germany. |
| *Light and Lighting. | Light and Lighting. The Illuminating Engineering Society, 32 Victoria Street, London, S.W.1. |
| *Mech. Engng, N.Y. | Mechanical Engineering. The American Society of Mechanical Engineers, 29 West 39th Street, New York. |
| *Mem. Coll. Engng Kyoto | Memoirs of the College of Engineering, Kyoto Imperial University. Maruzen Co., Ltd., Tokyo. |
| *Mem. Coll. Sci. Kyoto | Memoirs of the College of Science, Kyoto Imperial University. Maruzen Co., Ltd., Tokyo. |
| *Mem. Fac. Engng Hokkaido | Memoirs of the Faculty of Engineering, Hokkaido Imperial University, Sapporo, Japan. |
| Mem. India Met. Dep. | Memoirs of the India Meteorological Department. The Manager of Publications. The India Meteorological Department, Simla, India. |
| *Mem. Manchr Lit. Phil. Soc. | Memoirs and Proceedings of the Manchester Literary and Philosophical Society. 36 George Street, Manchester, England. |
| *Mem. Ryoj. Coll. Engng | Memoirs of the Ryojun College of Engineering. The Chairman of the Publication Committee, Ryojun College of Engineering, Port Arthur, South Manchuria. |
| *Met. Z. | Meteorologische Zeitschrift. F. Vieweg und Sohn A.G., Vor der Burg 18, Braunschweig, Germany. |
| *Min. Mag. | Mines Magazine. F. J. Nagl, 734 Cooper Building, Denver, Colorado, U.S.A. |
| *Misc. Publ. U.S. Bur. Stand. | Miscellaneous Publications of the National Bureau of Standards. U.S. Department of Commerce, Superintendent of Documents, Government Printing Office, Washington, D.C. |
| Mon. Not. Geophys. Suppl. Roy. Astr. Soc. | Monthly Notices, Geophysical Supplement of the Royal Astronomical Society. Burlington House, London, W.1. |
| *Mon. Not. Roy. Astr. Soc. | Monthly Notices of the Royal Astronomical Society. Burlington House, London, W.1. |
| Mon. Weath. Rev., Wash. | Monthly Weather Review. Superintendent of Documents, Government Printing Office, Washington, D.C. |
| *Nature, Lond. | Nature. Macmillan & Co., Ltd., St. Martin's St., London, W.C.2. |
| *Naturwissenschaften | Naturwissenschaften. J. Springer, Linkstrasse 22–24, Berlin, W.9. |
| Observatory | Observatory. Taylor & Francis, Red Lion Court, Fleet Street, London, E.C.4. |
| *Pap. Phys. Oceanogr. Met., Massachusetts | Papers in Physical Oceanography and Meteorology. The Massachusetts Institute of Technology and Woods Hole Oceanographic Institution, Cambridge and Woods Hole, Mass., U.S.A. |

| *Abbreviations* | *Full title and address* |
|---|---|
| *Phil. Mag. | The London, Edinburgh and Dublin Philosophical Magazine and Journal of Science. Taylor & Francis, Red Lion Court, Fleet Street, London, E.C.4. |
| *Philos. Trans. | Philosophical Transactions of the Royal Society of London. Cambridge University Press, Bentley House, Euston Road, London, N.W.1. |
| *Photogr. J. | Photographic Journal. The General Editor, The Royal Photographic Society, 16 Princes Gate, London, S.W.7. |
| Phys. in regelmäss. Ber. | Die Physik in regelmässigen Berichten. J. A. Barth, Salomonstrasse 18b, Leipzig, C.1, Germany. |
| Phys. Rev. | The Physical Review. The American Institute of Physics, 175 Fifth Avenue, New York. |
| Phys. Z. | Physikalische Zeitschrift. S. Hirzel, Königstrasse 2, Leipzig, C.1, Germany. |
| *Proc. Amer. Acad. Arts Sci. | Proceedings of the American Academy of Arts and Sciences. 28 Newbury Street, Boston, Mass., U.S.A. |
| Proc. Amer. Phil. Soc. | Proceedings of the American Philosophical Society. Independence Square, Philadelphia, Pa., U.S.A. |
| *Proc. Camb. Phil. Soc. | Proceedings of the Cambridge Philosophical Society. Cambridge University Press, Bentley House, Euston Road, London, N.W.1. |
| *Proc. Imp. Acad., Tokyo | Proceedings of the Imperial Academy. Ueno Park, Tokyo. |
| *Proc. Indian Acad. Sci. | Proceedings of the Indian Academy of Sciences. Hebbal, Bangalore, India. |
| *Proc. Leeds Phil. Lit. Soc. | Proceedings of the Leeds Philosophical and Literary Society. Prof. R. Whiddington, The University, Leeds, England. |
| *Proc. Nat. Acad. Sci., Wash. | Proceedings of the National Academy of Sciences. The Home Secretary, The National Academy of Sciences, Constitution Avenue and 21st St., Washington, D.C. |
| *Proc. Nat. Inst. Sci. India | Proceedings of the National Institute of Sciences of India. 1 Park Street, Calcutta, India. |
| *Proc. Phys.-Math. Soc., Japan | Proceedings of the Physico-Mathematical Society of Japan. Faculty of Science, Tokyo Imperial University, Tokyo. |
| Proc. Phys. Soc., Lond. | Proceedings of the Physical Society. 1 Lowther Gardens, Exhibition Road, London, S.W.7. |
| *Proc. Roy. Instn | Proceedings of the Royal Institution of Great Britain. 21 Albemarle Street, London, W.1. |
| *Proc. Roy. Irish Acad. | Proceedings of the Royal Irish Academy. Hodges, Figgis & Co., Dublin; and Williams & Norgate, 36 Great Russell Street, London, W.C.1. |
| Proc. Roy. Soc. | Proceedings of the Royal Society of London. Cambridge University Press, Bentley House, Euston Road, London, N.W.1. |
| *Proc. Roy. Soc. Edinb. | Proceedings of the Royal Society of Edinburgh. Oliver & Boyd, Tweeddale Court, Edinburgh, and 98 Great Russell Street, London, W.C.1. |
| *Proc. Roy. Soc. Vict. | Proceedings of the Royal Society of Victoria. Victoria Street, Melbourne, C.1, Australia. |
| *Proc. Univ. Durham Phil. Soc. | Proceedings of the University of Durham Philosophical Society. E. Patterson, Asst. Librarian, King's College, Newcastle upon Tyne, England. |
| *Publ. Dep. Sci. Industr. Res. | Publications of the Department of Scientific and Industrial Research, H.M. Stationery Office, York House, Kingsway, London, W.C.2. |
| Publ. Dom. Astrophys. Obs. Vict., B.C. | Publications of the Dominion Astrophysical Observatory, Victoria. Victoria, B.C., Canada. |
| Publ. Dom. Obs. Ottawa | Publications of the Dominion Observatory, Ottawa. Department of Mines and Resources, Ottawa. |

| *Abbreviations* | *Full title and address* |
|---|---|
| *Publ. Fac. Cienc. Fis.-Mát. La Plata | Publicaciones de la Facultad de Ciencias Fisico-matemáticas de la Universidad Nacional de la Plata. La Plata, Argentine. |
| *Quart. J. Roy. Met. Soc. | Quarterly Journal of the Royal Meteorological Society. 49 Cromwell Road, South Kensington, London, S.W.7. |
| *Radiography | Radiography. Journal of the Society of Radiographers, 32 Welbeck Street, London, W.1. |
| *Radiology | Radiology. The Secretary-Treasurer, The Radiological Society, 607 Medical Arts Building, Syracuse, N.Y., U.S.A. |
| *Rep. Aero. Res. Inst. Tokyo | Report of the Aeronautical Research Institute. Tokyo Imperial University, Komaba, Tokyo. |
| *Rep. Brit. Elect. Allied Industr. Res. Assoc. | Reports of the British Electrical and Allied Industries Research Association. 15 Savoy Street, London, W.C.2. |
| Rep. Phys. Soc. Progr. Phys. | Reports on Progress in Physics. 1 Lowther Gardens, Exhibition Road, London, S.W.7. |
| *Repr. Univ. Ill. Eng. Exp. Sta. | Reprint Series of the University of Illinois Engineering Experiment Station. University of Illinois, Urbana, Illinois, U.S.A. |
| Rev. Mod. Phys. | Reviews of Modern Physics. The American Institute of Physics, 175 Fifth Avenue, New York. |
| *Rev. Sci. Instrum. | Review of Scientific Instruments. The American Institute of Physics, 175 Fifth Avenue, New York. |
| *Rev. Univ. nac. Tucumán | Revista de la Universidad Nacional de Tucumán, Tucumán, Argentine. |
| *Sci. and Culture | Science and Culture. University College of Science, 92 Upper Circular Road, Calcutta, India. |
| Sci. Notes India Met. Dep. | Scientific Notes of the India Meteorological Department. The Manager of Publications, The India Meteorological Department, Simla, India. |
| *Sci. Pap. Inst. Phys. Chem. Res., Tokyo | Scientific Papers of the Institute of Physical and Chemical Research. Komagome, Hongo, Tokyo. |
| Sci. Proc. Roy. Dublin Soc. | Scientific Proceedings of the Royal Dublin Society. Ballsbridge, Dublin; and Williams & Norgate, 36 Great Russell Street, London, W.C.1. |
| *Sci. Rep. Tohoku Univ. | Science Reports of the Tohoku University. Maruzen Co., Ltd., Sendai, Tokyo. |
| Sci. Rep. Tsing Hua Univ. | Science Reports of Tsing Hua University. Peiping, China. |
| *Science | Science. The Science Press, Grand Central Terminal, New York. |
| *Sears Foundation, J. Mar. Res. | Sears Foundation: Journal of Marine Research. Bingham Oceanographic Laboratory, Yale University, New Haven, Connecticut, U.S.A. |
| Spec. Publ. U.S. Cst Geod. Surv. | Special Publications of the Coast and Geodetic Survey. U.S. Department of Commerce, Government Printing Office, Washington, D.C. |
| *Techn. Pap. U.S. Bur. Min. | Technical Papers of the Bureau of Mines. U.S. Department of Commerce, Superintendent of Documents, Government Printing Office, Washington, D.C. |
| *Technol. Rep. Tohoku Univ. | Technology Reports of the Tohoku Imperial University. Maruzen Co., Ltd., Sendai, Japan. |
| Terr. Magn. Atmos. Elect. | Terrestrial Magnetism and Atmospheric Electricity. The Johns Hopkins Press, Baltimore, Maryland, U.S.A. |
| *Tohoku Math. J. | The Tohoku Mathematical Journal. Maruzen Co., Ltd. Sendai, Japan. |
| Tokyo Astr. Bull. | Tokyo Astronomical Bulletin. Tokyo. |
| Trans. Amer. Geophys. Un. | Transactions of the American Geophysical Union. National Research Council, Constitution Avenue and 21st Street Washington, D.C. |

| *Abbreviations* | *Full title and address* |
|---|---|
| *Trans. Electrochem. Soc. | Transactions of the Electrochemical Society. Columbia University, New York. |
| *Trans. Faraday Soc. | Transactions of the Faraday Society. Gurney & Jackson, 98 Great Russell Street, London, W.C.1. |
| *Trans. Illum. Engng Soc., Lond. | Transactions of the Illuminating Engineering Society. 32 Victoria Street, London, S.W.1. |
| *Trans. Instn Engrs Shipb. Scot. | Transactions of the Institution of Engineers and Shipbuilders in Scotland. Elmbank Crescent, Glasgow, Scotland. |
| *Trans. Instn Nav. Archit., Lond. | Transactions of the Institution of Naval Architects. 10 Upper Belgrave Street, London, S.W.1. |
| *Trans. Roy. Soc. Can. | Transactions of the Royal Society of Canada. Ottawa. |
| *Trans. Roy. Soc. Edinb. | Transactions of the Royal Society of Edinburgh. Oliver & Boyd, Tweeddale Court, Edinburgh, and 98 Great Russell Street, London, W.C.1. |
| *Z. angew. Math. Mech. | Zeitschrift für angewandte Mathematik und Mechanik. VDI-Verlag, G.m.b.H., Dorotheenstrasse 40, Berlin, N.W.7. |
| *Z. Elektrochem. | Zeitschrift für Elektrochemie und angewandte physikalische Chemie. Verlag Chemie, G.m.b.H., Corneliusstrasse 3, Berlin, W.35. |
| Z. Kristallogr. | Zeitschrift für Kristallographie, Kristallgeometrie, Kristallphysik, Kristallchemie. Akademische Verlagsgesellschaft m.b.H., Sternwartenstrasse 8, Leipzig, C.1, Germany. |
| *Z. Metallk. | Zeitschrift für Metallkunde. VDI-Verlag, G.m.b.H., Dorotheenstrasse 40, Berlin, N.W.7. |
| Z. Phys. | Zeitschrift für Physik. J. Springer, Linkstrasse 22–24, Berlin, W.9. |
| *Z. phys. Chem. | Zeitschrift für physikalische Chemie (Abteilungen A und B). Akademische Verlagsgesellschaft m.b.H., Sternwartenstrasse 8, Leipzig, C.1, Germany. |
| *Z. techn. Phys. | Zeitschrift für technische Physik. J. A. Barth, Salomonstrasse 18b, Leipzig, C.1, Germany. |
| *Z. Ver. dtsch. Ing. | Zeitschrift des Vereines deutscher Ingenieure. VDI-Verlag, G.m.b.H., Dorotheenstrasse 40, Berlin, N.W.7. |

# ABSTRACTORS

G. E. Allan, D.Sc.
C. B. Allsopp, M.A., Ph.D.
J. P. Andrews, D.Sc., F.Inst.P.
W. R. Angus, M.A., B.Sc., Ph.D.
N. F. Astbury, M.A., F.Inst.P.
G. O. Baines, M.A., Ph.D., A.Inst.P.
E. H. W. Banner, M.Sc., M.I.E.E., F.Inst.P.
S. G. Barker, Ph.D., F.Inst.P.
F. S. Barton, M.A., B.Sc., F.Inst.P., A.M.I.E.E.
G. E. Bell, M.Sc., Ph.D., A.Inst.P.
J. E. Bennett, M.A., A.M.I.E.E.
W. G. Bickley, D.Sc.
P. H. Bigg, B.Sc.
N. M. Bligh, A.R.C.S., A.I.C.
F. J. Brislee, D.Sc., F.I.C.
L. G. Carpenter, B.A., B.Sc.
T. A. Chalmers, B.Sc., Ph.D.
F. C. Champion, M.A., Ph.D.
J. S. Clark, B.Sc., A.R.C.S., D.I.C.
K. M. Constable, B.A., B.Sc.
C. Crampton, B.Sc.
R. Davis, M.Sc.
G. H. Dieke.
E. H. Dock, M.Sc., A.R.C.S., D.I.C., A.Inst.P.
W. E. Duncanson, M.Sc., Ph.D.
L. Essen, B.Sc.
J. Ewles, M.A.
D. H. Follett, M.A., F.Inst.P.
R. C. Fox, Ph.D., B.Sc.(Eng.), A.M.I.E.E.
L. E. Furtmüller, Ph.D.
A. E. M. Geddes, M.A., D.Sc.
W. H. George, M.Sc., Ph.D., F.Inst.P.
G. Greenwood, M.Sc., A.Inst.P.
S. J. Gregg, Ph.D., A.R.C.S.
G. P. Harnwell.
H. H. Harrison, M.Eng., M.I.E.E.
L. Hartshorn, D.Sc., A.R.C.S., D.I.C.
A. Harvey, Ph.D., B.Sc., F.Inst.P.
A. von Hippel.
H. H. Hodgson, Ph.D., M.A., B.Sc.
D. R. Hudson, B.Sc.
A. Hunter, Ph.D., D.I.C., F.R.A.S.
J. Iball, D.Sc., Ph.D., F.Inst.P.
T. I. Jones, M.Sc., Ph.D., A.R.C.S.
J. Kaye, B.Sc.
L. Kellner, Ph.D.
J. E. Keyston, B.Sc., Ph.D.
B. J. Leggett, M.R.C.S.
A. J. McConnell, D.Sc., F.T.C.D.
G. C. McVittie, M.A., Ph.D., F.R.A.S.
A. S. D. Maunder, F.R.A.S.
A. J. Mee, M.A., B.Sc.
A. C. Menzies, M.A., D.Sc.
R. Mines, B.Sc.(Eng.).
R. E. Neale, B.Sc., A.C.G.I., A.M.I.E.E.
R. Neumann, B.Sc.
O. Oldenberg.
R. Peierls, M.A., Ph.D., D.Sc.
R. W. Powell, B.Sc., Ph.D.
R. S. Read, M.A., B.Sc.
W. A. Richardson, B.A., D.Sc., B.Sc.(Eng.).
J. E. Roberts, Ph.D.
E. Rushton, B.Sc.
M. G. Say, Ph.D., M.Sc., M.I.E.E.
D. Shoenberg, Ph.D.
H. G. Solomon, A.C.G.I., M.I.E.E.
H. J. H. Starks, Ph.D., A.Inst.P.
S. A. Stigant, M.I.E.E.
W. S. Stiles, Ph.D., D.Sc.
E. O. Taylor, B.Sc., A.M.I.E.E.
J. Thewlis, D.Sc.
A. M. Thomas, B.Sc., F.Inst.P., A.M.I.E.E.
J. S. G. Thomas, D.Sc.
M. S. Vallarta.
J. W. T. Walsh, M.A., D.Sc., M.I.E.E.
W. H. Walton, B.Sc.
W. H. Ward, B.Eng.
J. B. Warren, Ph.D., A.R.C.S., A.Inst.P.
W. W. Watson.
C. E. Webb, B.Sc., A.C.G.I., D.I.C., A.M.I.E.E.
J. J. Weigle.
S. Weintroub, M.A., A.Inst.P.
A. C. Whiffin, B.Sc., M.Sc.(Eng.).
E. E. Widdowson, M.Sc., Ph.D., A.Inst.P.
A. Wilkinson, B.Sc.
A. P. Wilmshurst, A.C.G.I., A.M.I.E.E.
A. B. Wood, D.Sc.
W. D. Wright, D.Sc., A.R.C.S., D.I.C.

Editor: J. A. Wilcken, B.Sc., Ph.D.